

ROUTINE MAINTENANCE AND SUSTAINABILITY OF EXISTING SOCIAL HOUSING

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ABSTRACT

Improving the sustainability of the housing stock is a major challenge facing the UK social housing sector. UK social housing accounts for approximately 18% of total UK housing and generates maintenance costs in the region of £1.25 billion per annum. The extent to which routine maintenance can be used as a vehicle to improve the overall sustainability (social, environmental and economic) of existing social housing is one focus of a 5 year EPSRC funded research programme. This paper reports the findings of a questionnaire survey examining current social housing maintenance practices and attitudes towards sustainability.

The research found that, whilst the stock condition survey is the favoured format for determining maintenance need and economics the basis for priority setting; neither systematically addresses wider sustainability issues; and, whilst cost is a major barrier to more sustainable solutions being adopted, landlords are able and have the desire to improve their practices.

KEYWORDS: social housing; sustainability; maintenance practice.

BACKGROUND TO UK SOCIAL HOUSING

According to the 2005 English House Condition Survey (DCLG, 2008) there are approximately 21.8 million homes in England of which approximately 3.9 million (18%) are within the social sector; 2.2 million owned by Local Authorities (LA) and 1.7 million owned by Registered Social Landlords (RSL). Further, demolition rates in the UK are currently very low - approximately 0.8% of housing replaced each year (DCLG, 2006a) and, given increased demand, by 2050 approximately 70% of the housing stock will comprise that already built today. Thus if the housing stock is to address the social, environmental and economic aspects of sustainability, the housing industry will have to work largely with today's stock.

There have been concerns' regarding the condition of social housing since the 1980's when a combination of low management and maintenance allowances, unwillingness to raise rents to match repair needs and restrictions preventing the cross subsidisation of Housing Revenue Accounts from general funds resulted in large repair backlogs (DGLC, 2000). By 1996 the repairs backlog had reached £19 billion for England alone (DCLG, 2008) which in turn prompted the UK Government's commitment to make housing decent by 2010 - The Decent Home Standard (DHS). The DHS was conceived as a minimum standard which triggers action if a range of decency standards are not met. A property is considered decent if it: satisfies Housing Health and Safety Rating System (HHSRS) as fit for purpose; is in a reasonable state of repair; has reasonably modern and appropriately located facilities; and has a reasonable degree of thermal comfort (SAP 2005 rating of 35 or more). In 1996 there were 9.1 million non-decent dwellings in the UK which had reduced to 6 million in 2005, of which 1.2 million dwellings were in the social rented sector. However, whilst the DHS goes some way to addressing the quality of UK housing, it is not a sustainability standard and as such is likely to have minimal impact on this aspect of the UK housing stock.

SUSTAINABLE DEVELOPMENT

A widely used and accepted definition of sustainable development is 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987) and over the last 20 years there has been a growing realisation that, in the UK people are not living within their means. In response, the UK Government, Scottish Executive, Welsh Assembly Government and the Northern Ireland Administration agreed a set of five principles (living within environmental limits; ensuring a strong, healthy & just society; achieving a sustainable economy; using sound science responsibly; and promoting good governance) as the basis for sustainable development. In the context of the built environment this has forced those responsible for developing and managing buildings to examine the impact that their buildings have on the environment and develop policy and strategies to reduce that impact over time. This is particularly pertinent to energy reduction where 27% of UK energy use is attributable to buildings of which 53% is as a result of space heating, 20% water heating, 6% lighting, 16% appliances and 5% cooking (DCLG, 2006b).

There are a number of existing and announced policies affecting domestic energy efficiency of UK buildings, including; the 1997 Kyoto protocol under which the EU set targets to reduce greenhouse gas emissions by 20% (compared to 1990 levels) by 2020; EU Energy Performance of Buildings Directive 2002 which requires all member states to achieve a minimum energy performance target for buildings; and the Climate Change Bill which proposes unilateral carbon dioxide reduction target of 26-32% by 2020 and 60% by 2050. However these targets cannot be met through new building development alone. Based on an analysis of demolition rates and assuming all new housing in the UK is carbon neutral, Shipworth (unpublished) estimates that only around a 5% reduction in CO₂ emissions will be achieved by 2050. Thus, if the UK is to get close to its stated target, it must address the carbon footprint of its existing housing stock. But, in the UK the retrofitting of energy efficiency and zero/low carbon technologies to the existing building stock is low and hindered by high upfront costs even though implementation of such technologies should result in significant life cycle cost savings (fuel bills) for occupiers (DCLG, 2006). Finally, whilst technological solutions offer the potential for improvements in the sustainability of existing buildings, people's lifestyle and behaviour must also be addressed if the 2050 target is to be achieved. To this end: greater community engagement; deliberative forums to help people live more sustainable lifestyles; investigating ways in which stakeholders can influence decision making; new commitments to support education and training in sustainable development; and response to key environmental taxes are all challenges that those seeking to create future sustainable communities need to address (HMSO, 2005). Currently none of these issues regularly inform built asset management strategies.

CURRENT MAINTENANCE PRACTICES

The Stock Condition Survey (SCS) is central to the social housing maintenance decision making process (Fig. 1). The survey provides a snapshot of the physical condition of the housing stock at a particular point in time from which a stock condition profile model is developed that predicts maintenance demand and the associated budget requirements over a 25-30 year period (note: a rolling 12 month budget is also determined). The demand for maintenance action is predicted using data relating to the length of time remaining before a component fails/requires maintenance. Maintenance need is determined by considering the

physical condition of components and compliance with the DHS (note: with the exception of the HHSRS the standard is not an absolute but relative to individual organisations). Budgetary constraints and specification standards (e.g. legislation) are applied to the demand profile and maintenance options and risk are assessed to ensure that the housing stock remains viable over the period until the next refurbishment stage. Finally, for cash flow purposes the demand model is ‘smoothed’ using algorithms and alternative maintenance strategies (e.g. responsive; planned maintenance etc) are assessed.

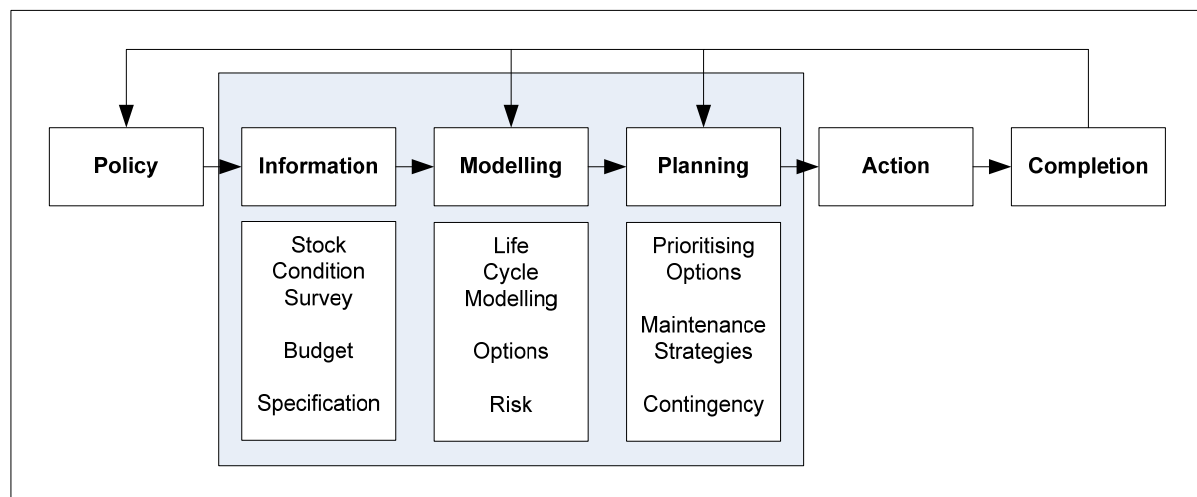


Figure 1. The Built Asset Maintenance Process Model (source: Wordsworth, 2001)

There are a number of well documented problems with the afore mentioned model (Sharp & Jones, 2007). Although it is assumed that organisational policies drive the maintenance planning process, in many instances policy objectives are unclear and an organisation's strategic objectives are not linked to its maintenance programmes. The effectiveness and efficiency of using the stock condition survey process as the basis for developing planned maintenance programmes has also attracted criticism. Chapman (1999) identified: poor specification of initial requirements; unclear aims and objectives and inappropriate frameworks; an inability to predict long term cost requirements; variations in levels of experience of those conducting surveys; unrealistic claims by consultants selling survey services; inappropriate or unusable data; poor links to organisational objectives; and a lack of fit of survey data to maintenance programmes as the key factors that contributed to high levels of dissatisfaction amongst social landlords. Dissatisfaction is further heightened by approaches to priority setting which are often simplistic, introducing subjective elements into the decision-making process which makes it difficult for maintenance managers to justify their decisions (Shen et al, 1998) to others. Finally the process model implies a feedback loop which in reality rarely occurs resulting in the same mistakes being made over and over again (Arditi & Nawakorawit, 1999). Given the above concerns there must be doubt about the ability of such a system to accommodate the wider range of criteria that need to be considered if the objectives of improving the sustainability of existing social housing is to be achieved through routine maintenance/refurbishment. These concerns formed the basis of a research project funded by the UK Engineering and Physical Sciences Research Council.

THE RESEARCH PROJECT

The project aimed to identify the issues/problems faced by Social Landlords as they attempt to improve the quality of their existing stock in a way that is environmentally, socially and economically sustainable. Through a postal questionnaire survey the project sought to identify the extent to which those responsible for UK social housing maintenance believed that their maintenance process, both planned and reactive, could be used as a means to improve the sustainable performance of their stock. Between October 2006 and March 2007 768 questionnaires were distributed to all parent RSLs (head of groups) all LAs who maintained responsibility for the maintenance of their housing stock and all Arms Length Management Organisations (ALMOs), throughout England and Wales of which 95 completed returns were received. This represents a return rate of 14% from organisations responsible for approximately 19% of the total UK social housing stock. Whilst the returns may be slightly biased towards larger social housing organisations the authors believe that they are representative of the English/Welsh social housing sector as a whole.

RESULTS FROM THE SURVEY

Housing Maintenance

For all three types of social landlord, whilst the primary housing maintenance decision making tool is the stock condition survey, there was some evidence that other measures (beyond those traditionally used) were being used to identify maintenance need. In particular there appeared to be a move to incorporate performance based tools such as SAP ratings into the decision-making process. There did not appear to be any trend between the size of the organisation, in terms of property portfolio, and the types of information collected, however smaller organisations (0-1000 properties) appear to carry out more annual building inspections, with the remaining concentrating on cyclical inspections of varying frequency (normally 4-5 years). For all organisations the major source of information for estimating maintenance budgets was property inspections followed by the previous years spend, or a combination of the two. In line with government targets there appeared to be a move towards planned preventative maintenance (PPM) compared to responsive maintenance (RM) with almost 70% of RSLs and 66% of LAs/ALMOs having a PPM:RM ratio of 60:40 or greater.

All three types of social landlord rated 'priority need' as the most important factor in determining maintenance actions with 'budget constraints' placed 2nd and 'political criteria' 3rd (and considered 'not important' by the majority of respondents). Approximately 80% of organisations were using historical data to identify maintenance trends although the exact nature of this information is still to be determined through interview.

Traditionally maintenance and refurbishment works have been distinguished by their funding mechanism, with maintenance generally funded through the revenue account and refurbishment works by capital grant. However the results from the survey would suggest that this differential is being eroded as RSLs and ALMOs receive more commercial freedom. Indeed, most organisations appeared to distinguish between maintenance and refurbishment works by the size (cost or scale) of the project.

Housing Quality – The DHS

From the survey all three types of social landlord had a high DHS achievement rate; with 82% of RSLs and 67.8% of LA/ALMO stock being classed as 'Decent'. These values are in line with the findings of the 2005 EHCS. Those RSL properties that failed the DHS were doing so mainly because of thermal comfort and the lack of modern and appropriate facilities. This again is in line with the findings of the EHCS (2005). Those LA/ALMO properties failing the DHS were doing so mainly due to repair and the lack of modern and appropriate facilities with failure due to thermal comfort only occurring in approximately 12% of dwellings. This finding is in contrast to the findings of the EHCS 2005. One possible explanation for the difference between the findings of this survey and the EHCS could be the impact of the HHSRS. Whilst this has been widely adopted by LA/ALMOs (71.4% of organisations had incorporated it into their SCS) and to a lesser extent by the RSL sector (59% had adopted it).

Whilst the DHS has impacted on the maintenance planning of the vast majority of respondents (which would be expected considering the Government's target that all social housing should be decent by 2010), its effectiveness as a standard for driving improvements in social housing received a mixed response. Positive comments made in response to open text questions included: "the DHS has reduced the pressure on revenue and has provided more funding for the housing stock"; "has raised the standard of works"; and "has enabled a more planned approach to delivering investment to address stock failure and plan and programme work in a more effective way that provides best value". Negative comments included: "the DHS criteria does not match tenant expectations or maintenance plans"; "leads to quantity rather than quality works"; and "is building centric and limited to a small number of elements/components". A similar divergence of views existed for the impact that the DHS has on sustainability with approximately 50% of RSL respondents and 67% of LA/ALMO respondents believing that the DHS will improve the sustainability of their housing stock, primarily because it has raised the status of maintenance and refurbishment amongst senior management, and the remainder believing it will have a negative impact primarily because of its failure to address wider social or environmental issues.

Sustainability Strategy

All respondents believed the sustainability debate was important to their work and most believed it had affected their maintenance practices to some degree.

Whilst most organisations rated their current practices as slightly or moderately sustainable, they also considered there was significant room for improvement. More consultation with neighbours; better understanding of sustainability issues; wider application of EcoHome principles (but not necessarily EcoHomesXB – see later); a better ratio of planned works to responsive repairs; the use of sustainable construction materials including recycled materials; the use of local contractors to minimise transport; and wider implementation of waste minimisation practices were some of the ways that respondents believed their current practices could be improved.

Only about half of the respondent organisations (mainly the larger ones) had a company wide sustainability policy and only about 40% of these measured the sustainability of their existing stock. Of those that did measure the sustainability of their stock very few used any recognised standard (note: toolkits such as EcoHomes XB were considered to: be too

complicated; take too long to complete; require additional information to be collected which cannot otherwise be utilised; and to not add value to the decision making process.) with the majority developing their own ad-hoc measures to reflect their specific stock profile and circumstances. Where the sustainability of the stock is measured, 70% use the results to inform their maintenance strategies.

Respondents rated a range of factors which they believed should be included in a sustainable maintenance system. Of the 31 factors listed in the questionnaire, improvements to overall building performance, production of home user guides (note: Approximately 80% of respondents engage their tenants in energy awareness and other sustainability issues, primarily through awareness raising activities; active tenant forums and annual tenant training), increase proportion of works programmed through PPM, use of low environmental impact materials, the use of low toxicity paints, household security, the use of local labour, monitoring of best practice for air and water pollution, protection of existing eco features, and the use of renewable energy were the top 10 rated changes required to current maintenance practices.

As expected, cost was the overriding internal barrier to incorporating more sustainable solutions into maintenance planning (compared to bureaucracy, culture leadership and information) whilst a lack of incentive, and a lack of joined up legislation were the main external barriers (compared to commercial imperatives, government leadership, lack of technology and legislation). With regards to additional costs, the majority of RSLs believed that they were able to justify an increase of between 3-5% in initial costs to incorporate a more sustainable solution whilst 40% of LA/ALMOs believed they could justify an increase of between 6- 10%.

DISCUSSION OF RESULTS

The results from the questionnaire survey show that in general current maintenance practices do not fully address the social, environmental and economic aspects of sustainability. Even those organizations that have formally addressed the issues of sustainability do not routinely measure the performance of their stock against sustainability indicators or use the sustainability agenda to set targets or priorities. Indeed, in line with the UK Governments agenda, the DHS has been the primary focus for maintenance (and refurbishment) planning. This standard was not conceived, and is not perceived, to be a sustainability driver and, whilst it has generated more funding for stock improvement works, primarily by raising the status of maintenance and refurbishment at board level, it is viewed by many as a minimum standard which does not address the wider social and environmental issues that need to be addressed.

Current maintenance practices are perceived to be only slightly/moderately sustainable and offer significant opportunities for improvement. In particular there is a desire amongst maintenance managers for greater inclusion of sustainability principles, and in particular environmental and social performance measures of the 'home in use' into the maintenance process. Whilst there is some evidence that this is beginning to occur, particularly the use of SAP ratings, it is also clear that those toolkits specifically developed for assessing the sustainability of existing homes are having little impact. Indeed, it would appear that where sustainability principles have been integrated into the maintenance decision making process organisations have developed their own toolkits that more closely mirror local needs and

priorities. This flexibility of approach would appear to be a critical criteria lacking from the current maintenance process model.

A SUSTAINABLE HOUSING MAINTENANCE MODEL

As a result of the questionnaire survey the authors have developed a new maintenance process model that they believe more clearly addresses the sustainability agenda (Fig. 2).

The proposed sustainable housing maintenance model is a generic model which can incorporate individual Landlord requirements. The model is based around the development of a series of indicators (toolkits) that assess the physical, social, environmental and economic performance of a 'home in use' against government agendas and local priorities. If issues are identified then a series of analysis toolkits are used to establish the underlying cause(s) and a project brief is developed that describes the problem to be solved and specifies the required improvements to performance. A series of modelling toolkits then prioritise the actions required and assess the most appropriate strategy (PPM, RM Design Out, Operate to Failure etc) for action. Finally a series of performance indicators assess the impact of the interventions against the required improvements specified in the project brief and feeds this information back into the process for future reference. The model is effectively a multi-criteria performance based assessment of the home in use. The model is currently being trialled with a UK social housing provider.

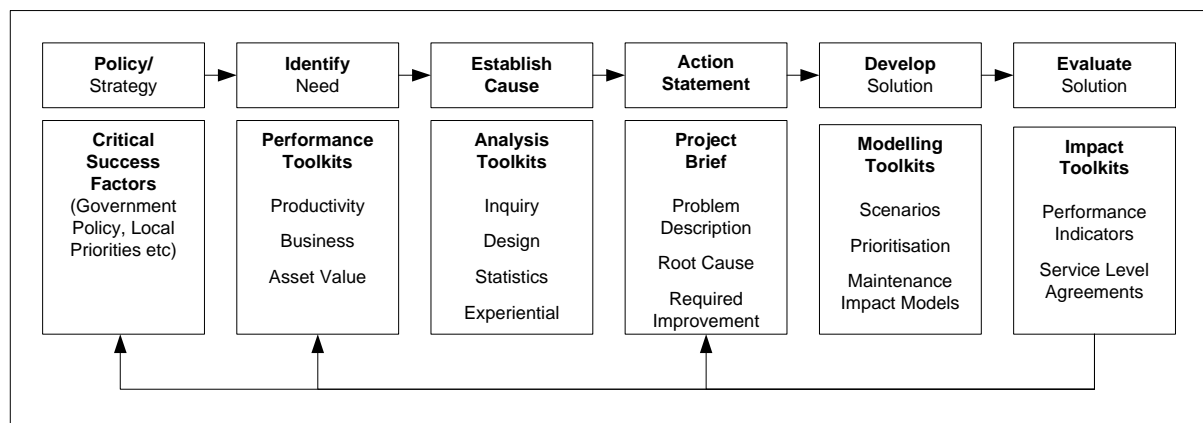


Figure 2. Performance Based Sustainable Housing Maintenance Model

CONCLUSION

The current approach to social housing maintenance does not fully address the social, environmental and economic aspects of sustainability and, whilst a wider range of criteria are being used by a small number of organisations to determine maintenance need and plan maintenance works, there use is disparate and not supported by established toolkits. Further, the vast majority of UK social housing maintenance managers believe their current maintenance practice can be improved to more fully embrace the sustainability agenda.

To ensure continued improved quality and sustainability of the existing built environment a new maintenance model is needed which is based on the performance of a building in use

rather than on its condition per se. This will require new knowledge to be generated at each stage of the maintenance / operational process. Maintenance managers will need to move away from the use of a (predominantly) single, subjective criteria model to a multi-criteria model which includes a holistic examination of the root cause of the problems and the technical and business solutions required to ensure the business case for action is established.

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